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LONDON: NEWMAN, 9, DEVONSHIRE STREET, BISHOPSGATE.

Bird-haunts of the Outer Hebrides.

By THEODORE C. WALKER, Esq.

(Continued from S. S. 2077.)

II.

EARLY next morning we emerge from the stifling hut into the joyous fresh air: we are accompanied by the schoolmaster, an intelligent Edinburgh student, and two of the best climbers of the island. The storm, mist and rain of the night before have vanished, and the west wind blows strong and fresh off the Atlantic. There being little heather in Mingalay, the Avifauna is rather different to some of the other islands. The natives depend for their subsistence partly on sheep, and partly on fish and birds and their eggs. As we tramp over the short turf up the hill-side, the rock pipits are blithly rising in the air, and sweetly singing with quivering wings, as they descend to their nests among the stones. Great ragged-looking hills rise on all sides, till they break off into abrupt precipices of tremendous height; a very thin covering of short turf, with black patches of stunted heather, a few inches high, with bare rock peeping out everywhere; lichen-covered gray stones, fallen from the hill-sides; the weird melancholy bleat of the sheep, the drifting clouds yet clinging to the highest pinnacle of rock, the hoarse croak of the raven, as flying lazily along he answers his mate, add to the desolate look of the scene. The whinchat is "chacking" on every bare rock; the common bunting is sitting singing on the turf dykes, and the lark is carolling high in the air, as we toil up the hill-side. These four birds—the rock pipit, the bunting, the whinchat and the lark—seem the commonest insessorial birds of these islands.

Reaching the edge of the precipice, what a scene unfolds before us! We are on the verge of the highest precipice of the whole "Long Island," as they call the Outer Hebrides; but the wind is so strong that it is dangerous to approach the edge. Close on our left is the Isle of Bernera or Barra Head, with its white lighthouse on the edge of the precipice, Sinclair's Isle and Horse Isle between, and at every point of this island the precipices are split up into seams, rents, caverns and bridges of rock: the huge billows of the Atlantic are dashing with the rage of despair, sending the white foam and spray in salt tears of agony streaming down their sides. Under us, to the

BRITISH 4 MY 70 MUSEUM

left, is an islet, spanned by a narrow bridge of rock, at its base ragged pinnacles of rock, terribly black and still amid the churning white foam. Cautiously descending, and crossing the "Devil's Bridge," I lay down behind a block of rock and look down. Close below, looking so near that one could almost leap across, yet so far that the strongest arm cannot throw a stone to reach it, is a stack of precipitous rock, its sides and summit covered with birds: one can distinguish the groups of rock birds on the ledges, like black and white specks, the ledges all white with excrement, but one cannot distinguish the different species—only a confused mass of birds sitting in groups and flying thick about the face of the rock. A pair of ravens, which have been narrowly watching me, now draw near, and out from the cliff beneath hop two juvenile ravens, and settle on the Devil's Bridge, while I in vain try to stalk them.

The climbers are below me, searching for eggs, but as the wind is too strong I do not follow them, but take out my telescope and scan the stack of rock and the grand precipices around me. Every crevice and cranny of rock teems with countless thousands of rock birds, so small, as seen from this great height, that the eye can only distinguish the white patches and the long lines of birds dotting them: the air is alive with birds, like clouds of gnats, flying about the cliffs, but the distance is too great to observe accurately. This stack of rock rising close in front is a breeding-place of the larger gulls, the great blackback, the herring and the lesser blackback; these, though they are for ever haunting the precipices, watching for eggs left exposed by the rock birds, seldom build in the midst of them, but generally on stacks of rock near. As I watch I see several larger gulls restlessly floating over the cliffs, and several pairs of herring gulls fly and float above me, laughing and cackling; for go where you may, by night or day, in the Outer Hebrides, if the herring gull sees you trying to stalk anything, it is sure to come flying round just out of gun-shot, alarming all the birds in the neighbourhood. The great blackback rises lightly from its bulky nest, and with motionless wing is slowly lifted higher and higher by the wind; now, altering the angle of its wings, swift as an arrow, it floats before the wind, then curving gracefully round, facing the wind, it is slowly borne aloft, advancing, to again float everywhere backwards and forwards without one flap of its beauteous wings. But while I am watching, what are those two gulls which soar and float above the stack of rock—gulls the like of which I have never seen before, the size of Larus canus, but with a black head?

As they float within a few yards, and I see their size, I am fairly puzzled to know what they are: they are certainly not L. ridibundus, being too large, and this not being the habitat of that species. They were without doubt breeding on the stack, but being very wary they would not alight, though I stayed long and patiently, watching them: it was useless to shoot, for they would fall into the boiling sea below, and no boat could near the stack. I need not say that I could not see the colour of the feet, the gulls always flying with their feet folded under the feathers. I have thought it might have been Bonaparte's gull; but reluctantly I am compelled to leave without coming to any satifactory conclusion.

I now rejoin the climbers, who have gathered many of the eggs of the guillemot and razorbill; but I shall leave all descriptions of the breeding and habits of the rock birds till we reach Barra Head, only saying that the whole of the west and south sides of Mingalay for three or four miles is one vast breeding-station, but the wind being so high I did not descend far, as in Bernera there are many sheltered nooks where one can observe the habits of the rock birds at leisure. During the last two seasons, owing to the enormous destruction of the rock birds at other stations, for ladies' plumes, the number of kittiwakes have perceptibly increased, as here they can breed in perfect safety from the most greedy bird-killer, for they cannot be shot from above, and the base of the precipices is so full of rocks, and such a current and surf is always running, that it is dangerous to approach near: every true naturalist will rejoice at this.

Climbing once more to the top of the precipice, I watch how the natives of these islands catch the birds. They use the flesh and eggs for food, often salting it down for winter use. One of the men sits on the verge of the cliff, at the mouth of a small gully, up which the wind, striking the precipice, comes with such irresistible force that on approaching near one is almost driven backwards; while the razorbills and guillemots, unable to settle on their ledges near, are whirled aloft like chaff. As some birds try to reach the ledges from below others dangle in the air over the gully, trying to get down, their wings and legs going all ways, in a ludicrous fashion, as they try in vain to settle. The climber, grasping his bird-pole firmly in both hands, is lying on the edge, his feet firmly planted against the rock, and as a luckless puffin is dangling in the air, trying to get down, he strikes it from below, and sends the stunned bird spinning far behind him, where his mate picks it up. The climber says that if the puffins or razorbills are hit very hard on the sternum or breast-bone they are not injured, but a very slight hit on the head stuns them at once.

Having procured several birds, we descend the moors, just as the pelting rain again comes on, shrouding the sea in mist, curling up the precipice, wreathing round us, as we scramble down the steep hill-side to the huts far below. The birds are plucked, boiled, and the flesh gnawed off by the men, but is not much relished by us, as it is tough, red and fishy-tasted: the eggs when fresh are delicious, those of the razorbill and guillemot having a rich orange yelk, and the white of a semitransparent opal colour.

The wind having moderated a little, we run down one of the boats, and launch her with great difficulty, owing to the heavy sea; then with six sturdy rowers we rise over the huge waves, which roll into the sheltered bay. Directly we get out of shelter the wind catches us with such tremendous force that we can hardly hold the oars. I pull stroke-oar, and straining every nerve, we force the boat inch by inch against the wind, which beats down upon us with solid irresistible force. On among the terrible current as it surges up around us, we get wet and weary, but manfully sticking at it for more than an hour, we get under the Shelter Rock. The gannets swoop and glide among the waves, and the rock birds fly and tumble and dive among the surf, unmindful of the wind. We jump ashore on the celebrated Barra Head with feelings of thankfulness.

Bernera, or Barra Head, is the last and most southerly island of the stormy Outer Hebrides; a gigantic rock, low at the north-east end, rising higher and higher, till facing the Atlantic, it dips suddenly down, as if awe-struck at the mighty ocean, in a terrible precipice, on the brow of which the white lighthouse stands, calmly shedding its intermittent light across the angry waste of waters—a light which, flashing and waning, like many a Christian's light, is often obscured when most direfully wanted. In the storm, when the air grows thick with vapour, clouds wrap around it, hiding its wasted light, for which eager eyes strain in vain. A trudge of a mile up the steep ascent, and we reach the fortress-like buildings with the white cross over the door, erected to propitiate the Catholic islanders. And now, furnished with letters from the Commissioners, we are most heartily received, and in the clean and comfortable rooms of the lightkeepers we talk over our plans for descending the precipice, and eagerly long for to-morrow's dawn.

III.

The island of Bernera, or Barra Head, is well described by Macgillivray, in his 'British Birds' (vol. v. p. 351). That accurate nature-loving naturalist describes in glowing terms its precipices as seen from below. I shall endeavour in the following chapters to describe this celebrated bird station, to traverse in imagination the awful precipices, and afterwards to describe the rearing of the young rock birds and their departure.

The island is about a mile in length and half a mile in breadth, the north-eastern end dipping into the sea, terminating in a group of rocks at Nisam Point, rising at the south-west end to the height of 683 feet, on the edge of which precipice the lighthouse is built. The lighthouse stands at the head of a gully, with two peninsulas of rock running out each side: across the end of one is a ruined fort, with an underground apartment, used by the natives in the olden time for shelter. The name of the north peninsula is Sloch-na-Page, the other Beorlin. It is not my intention to describe the many times I have been down, but to picture one, and the habits of the birds seen.

On the morning of the 3rd of June, having equipped ourselves with guns and game-bags, my brother and I, accompanied by a light-keeper, whom I shall call "Mac," prepare to descend the precipice of Beorlin. We have cast off coats and boots, and in our stockinged feet scramble down the steep grassy slope for a hundred feet or more, till we reach huge masses of fallen rock, some imbedded in soil, others resting on fragments of *débris*, which an incautious step would send bounding into the boiling sea beneath. Mac's pet Skye terrier follows us everywhere, now frantically rushing at the puffins' holes, and with struggling yelps scratches at them, whence he drags out a puffin, which he bites at the back of the head, and brings for our approval. Slowly descending, the "grass," as the bladder-campion is called, gradually gives place to bare rock, the *débris* of which lies scattered all about: a slip or a false step, and one would be hurled from ledge to ledge into the sea beneath. No such fears oppress me, as keeping close to Mac, the best climber in the Long Island, we get on to the hard rock, free from the loose *débris*.

The puffins, which higher up have sparingly tunnelled their burrows in the sandy soil, and are demurely sitting watching us, are here in great numbers, sitting in bands of about a dozen on fallen rocks, so tame that they allow one to approach almost within arm's length, turning their heads on one side, and tottering about, then with a fall forward they stretch out the head, expand the tail to the utmost, stretch out their beautiful orange-webbed feet wide on each side, and with small wings flapping vigorously, flicker off into the boiling sea beneath. The puffins which we see at the entrance to their holes or in the cracks are the males, and Mac says they are rather darker in colour than the females; that the male feeds the female while sitting, and that the birds which the natives kill by means of the bird-pole are nearly always males and very lean, while the females which are noosed while sitting on or near their eggs are females and are very fat. Searching in the cracks and crannies, we find several eggs of the puffin; those which are laid on the rock are quite clean and white, with pale spots in the shell, and of very various sizes, but those that are laid higher up in the turf-holes are stained dark ochre or brown by the wet mud. The precipice is now so steep that the base is hid, and we are climbing on the hard greenstone rock; but many dangerous places have to be leaped, for we are getting among the thick of the birds. The heart leaps with enthusiasm, and the head and eye are braced with eagerness to be among them. Leaving my brother in a secure place, to look after a few clean puffin's eggs, Mac and I scramble on; and now the puffins are giving place to the razorbills, which in many places lay in crannies, like the puffins, but more often on exposed ledges. The razorbills sit bolt upright, eyeing us with palpitating hearts and bills gaping with fright as we near them, then walking to the edge of the rock, with a fall forward like the puffin, they spread out their legs and tail, and rapidly fly below into the sea to await our departure: it seems the usual habit of the puffin, razorbill and guillemot, at starting to walk the edge, then jump or fall forward, spread out their wings, and fly down to the sea: they seem unable to rise from a flat surface, owing to of the weight of their bodies and the shortness of their wings. This being the height of the egg season they nearly all have eggs, and Mac and I scramble and climb into many perilous places to get rare varieties of eggs: the common varieties are of a white ground, sparingly spotted at the larger end with large and small blotches of chocolate and black-brown; others are of a pale bluish ground, with the same markings, and others are minutely freckled and blotched with dark brown all over. I am not successful in finding any razorbill laying *two* eggs, as Audubon says they do. This seems to be the most numerous species, and on every ledge or cranny razorbills crowd, some laying flat on their eggs, others are standing bolt upright beside them, doubtless male birds, which as we approach fly off, while the females stop till the last minute: many fly up from the sea towards us, but sheer off on a nearer approach. These ledges are foul with greenish white excrement, but are not nearly so filthy as the broader ledges of the guillemots further down, which are crowded with sitting and standing guillemots, the ledges coated and running down with greenish filth, and the feet, and breasts and eggs of the guillemots foul with uncleanness.

The lovely kittiwakes are flickering round us as we descend lower, and, in their dire extremity of terror, fly lightly as spirits close to our faces, crying "kittiw-e-a, kitti-e-a," circling round and round, while the heavy rock birds seem to fall off the ledges in fright. Many nests of the kittiwake are large enough to fill the crown of a hat, but these are old nests which the bird repairs and builds on year after year, many nests being much smaller: they are built of mud, sea-weed and campion-stalks, and are in many cases stuck to the wall on such a narrow crevice that they look like swallows' nests under the eaves of a house: many nests have only one egg, others have three, others none. I watch several birds building: one bird brings the mud and weed, while the other sits inside, turning round and moulding it with her breast and bill, scraping up the sides with her black feet. The eggs of the kittiwake are not nearly so finely marked as some gathered at Ailsa Craig several years back.

THEODORE C. WALKER.

(To be continued.)

About the Kittiwake's First Winter Plumage, &c.

By H. BLAKE-KNOX, Esq., J.P.

IT was my intention to answer Mr. Cordeaux's inquiry about the colour of the feet of the kittiwake (S. S. 2053), but I have had so much to do latterly that I could not even find time to put my foot on the sea since last autumn. The colour described by Mr. Cordeaux is quite natural and not at all abnormal, as my paper on this bird might make it appear. In answer to Mr. Alston (S. S. 2108) as to the irregularity of change of colour in the feet of the first winter kittiwake, there is decidedly a frequent development of colour earlier in some birds than others, but this does not materially affect the question. My account of the plumage of this bird (S. S. 549) is perfectly correct, but a year less than I now make the kittiwake immature. I have also erred in a way only too common amongst naturalists—that is, in terseness; in fact, when I wrote this paper I thought I was drawing it out too long, but I find that I did not write enough. I am of opinion now that the monthly plumages of the gulls should be written, to carry the plumages in one unbroken series of dissolving views from immaturity to age. "Dissolving" is by no means an inapt term to apply to their plumages, for fading and rejuvenating has a great deal to say to the transfigurations the gulls go through. As I find the subject is interesting to some I will give some notes on the immediate point at issue.

At S. S. 548, it will be seen by my synopsis of the plumage that I have given no colour for the feet till the second winter. I did this because it would be almost useless to give any determined colour before, and even at that age. After the autumnal moult the feet gradually change from black to *primrose-colour*, shading to brown.

At S. S. 549, No. 3, represents first plumage—that is, when the bird first takes wing, and after the hairs and down drop off the tips of the feathers. The feet at this time are distinctly and decidedly black, as is also the bill.

Passing No. 4, we come to No. 5, first winter: "Bill and feet still black." Correct as far as the season goes, say till December. It is here my shortcoming begins. I omit the feet and the bill of the spring half of first winter, which I should have given as—First Winter, B. Sometimes from December, as often from January, the feet show decidedly greenish gray,—an almost indescribable tint,—which as the spring advances becomes more determined in its pale primrose-colour cast. The bill at the same time shows evident traces of the dissolution of the black, the grayish yellow appearing like clouds in amber, gradually advancing in strength, till in March and often sooner it is perfectly tortoiseshelled, if I may make the word, with the two colours, black and sickly yellow.

In my plumage No. 6, first spring, I have culpably omitted both bill and feet colouring. I cannot, of course, be accused of ignorance in this respect, as the kittiwake, I am sorry to say, far, far too often meets my view, shot in scores at every season—for perhaps a more persecuted creature does not exist.

No. 7. *Second Summer.*—Feet more of an olive-brown. This olive-brown colour is of course built upon the grayish or olive-green of first spring.

It remains for me now to describe the feet of a first-winter bird after January, and I think it will agree with Mr. Cordeaux's and Mr. Alston's experience. At the present time I have only my journal from commencement of 1867 to refer to, and perhaps exact quotations will be more curious as showing the indescribable nature of the kittiwake's feet at this age. The first note for 1867 is February 20:—"Met a few dozen of kittiwakes; four were fired at by ——, and killed; the first was a beautiful adult bird, still in winter dress. The plumage of this bird struck me as very peculiar and beautiful, a most striking effect being produced by the shafts of the gray-blue feathers of the upper surface being darker than the webs of the feather, giving a striated appearance even to the primary coverts. The bill was intense lemon-colour; the lips and mouth red-orange; the orbits changing to the vermilion-red of summer. The second was in first winter: bill lemon and black; inside of mouth red-orange, except the edges of the bill, inside which are pure lemon. *Feet tawny, the prominent parts brown.* New feathers coming in the back, band at neck growing scanty, rest of plumage as in each winter."

The next note I thought worthy to make that year was on October 28th. It bears somewhat on this subject, so I quote it: "* * * Second autumn; still had brown feathers in the wing scattered through the coverts (this alludes to the dark band). The bill pale yellow and black, the mouth a dull fleshy orange-red: *the feet gray, clouded with black.* Many birds seen two months ago were in full second-winter plumage, having lost all trace of the old wing band."

Turning to 1868, I find a quantity of useful notes, but generally foreign to the present question. Any remark with regard to the feet I give.

"February 6. *Second Winter Plumage* (written *in extenso;* I only give the flesh colourings):—Bill: dull greenish lemon-colour, clouded slightly in parts with black; irides dark brown; orbits black. Inside of mouth and lips red. *Feet greenish cinereous, clouded with brown.*"

Same day. "*First Winter Plumage.*—Bill with scarcely any yellow. Mouth yellow-orange. Orbits black. Black bar still on neck. In the back and scapulars most of the feathers are those of first plumage, worn almost cinereous. There is nothing indeed different, but a few new plain lead-gray feathers in the back, the brighter colour of the mouth, the slight yellow on the bill, *and the paler feet* from the first plumage.

"March 18. *First Spring.*—A kittiwake in first spring was quickly losing the black band on neck. It has a remarkably narrow black band on the wing. (In collection).

"*Third Winter* or *Third Spring.*—In apparently adult state; had the bill still strongly clouded with black, in fact, as strongly as that of first spring. The orbits were almost vermilion, the feet a bright deep brown tinged with yellow (orange). (In collection).

"Another, shot same time and same age, had the orbits dull red-brown, the feet similar, the bill lemon-yellow, tinged with greenish at the end.

"March 24. * * * Several others in first spring had the dark band on the neck, others partly, others quite without—all were banded on the wings and tail. These were observed on the wing within oar's length of the boat, and were not molested."

I have first spring kittiwakes in collection, shot in March, quite devoid of the dark band on the neck, having lost it by moult, whereas others seen and killed in June still had remnants of it left.

"March 10. Bills and feet of three adult kittiwakes shot to-day:—No. 1, feet dark brown, inclining to black; soles of phalanges, not including the web, orange-red—the webs above paler than the surrounding parts; the tibia and the tarsal joint tinged with yellowish. Bill bright chrome-yellow, greenish yellow at tip. Inside of mouth and lips intense red; orbits dark, slightly tinged with vermilion; iris deep brown. No. 2. Orbits vermilion; bill deep chrome-yellow. Rest as No. 1. No. 3. Feet hair-brown, webs paler brown, ankle tinged with yellow; orbits slightly tinged with red; bill lemon-yellow.

Same date: "*First Winter Plumage.*—Two kittiwakes now lying before me in first winter are strikingly dissimilar. No. 1 has quite lost the black bar on neck, and is in new plumage on the back. No. 2 has the dark bar on the neck as full and beautiful as in October." Here follows an elaborate description of the plumage, from which I take the following:—"No. 1. Bill tortoiseshelled with lemon-colour and black. Mouth and lips orange-red. Irides dark brown, orbits black. Feet: *Front of tarsi and toes and exposed part of tibiæ yellow flesh-colour, irregularly tinged—more especially on the joints, edges of webs, and outside of tarsi—with brown; the joints on the sole are dark brown, the soles of tarsi being also strongly tinged with brown.*

Exposed part of tibia tinged livid. No. 2. Bill with very little lemon-colour, glossy black; mouth orange-red; orbits black. Feet strikingly similar to No. 1, *the flesh-colour inclining to very pale greenish lemon-colour.* Both are males, and both are in my collection.

"June 5, 1868. *Second Summer.*—Two in this stage were very different—a male and female. The male was a backward bird in very faded plumage, that of first winter being retained and very worn; the dark band was still on the neck, though faded to deep brown. The female was in the normal plumage of the season, the back feathers being all renewed and like the adult, the neck quite devoid of the band, and that on the wing faded to brown. The bills, of both dull lemon-yellow, shaded with black, the mouth deep red-orange, the orbits black. The feet dull yellowish gray, shaded with blackish, especially at the joints and the outside of tarsi, where they are quite dusky. (Female in collection).

So very worn are the quills, tail and wing-coverts of these birds that flight must have been a labour. The general summer and autumnal moult, which embraces these parts, would in all likelihood have commenced in a week or so, both birds after it presenting the same appearance. These birds give a good idea of the uncertainty of the spring change, and to one unacquainted with plumage would appear in different ages.

In 1869 I have also copious notes on the kittiwake, but, as I have gone further than I intended already, I shall refer but to one, on the 10th of February, when I had every winter of the kittiwake before me at the same time, *viz.*, first, second, third and adult. After having described the plumages minutely, and compared each and every winter, I describe the flesh-colouring thus:—

"*First Winter.*—The feet are browner than earlier in the season (very true). Bill clouded with pale lemon-yellow and black; orbits black; irides deep brown. Mouth orange-red.

"*Second Winter.*—Bill lemon-yellow, tinged with smoky black. Orbits dark mahogany or brownish black. Lips tinged with red, mouth deep red. Feet (of two): webs dark sand-colour, lightly tinged with the palest lemon-yellow, in one bird darker than in the other; tops of the toes, front of tarsi dark sandy brown, the joinings of the scutella inclining to dirty lemon-yellow white, the outside of tarsi and of outer toe dark smoky brown. Inside of tarsi, tibiæ and their joints strongly tinged with very pale lemon-yellow; in one bird the lemon-colour is hardly more than a sandy white.

"*Third Winter.*—Except for the plumage difference in the wing, this age is very like the adult. The feet are duller, more black and less brown, and have little or no orange tints through them; the lips generally less conspicuously red; the orbits brownish, though frequently red; the bill generally with dusky clouds at its base, but this, after second winter, is not a rule."

In my account of the kittiwake plumage (S. S. 552) after No. 12, I make the bird adult. Since writing this, however, I find that I can trace immaturity for another year, so that the kittiwake would not breed till four instead of three years. This stage is well defined. Read No. 13. *Third Winter.*—As the adult, but that the pencil feathers of the wing and those that form the extreme primary coverts and which lie solely over the first primary quill are more or less clouded with black, sometimes only a spot on the pencil, and I believe that even at times this spot is wanting. This age is very distinct from the glaringly apparent second winter. The feet, bill, &c., I could not define from the adult. The orbits, however, are never so red.

No. 14. Link 6. *Third Spring.*—Change from winter to summer. The head turns pure white, the orbits increase in red, the feet get more yellow into the brown.

No. 15. *Fourth Summer.*—Much like the adult, but as the wings moult but once a year and that in autumn, the black markings are still apparent about the pencil. At this age it associates with the young birds of one and two years old, and is found quite away from the breeding haunts. This is undoubtedly the barren kittiwake of authors.

After the next autumnal moult there is certainly no difference from the adult.

H. BLAKE-KNOX.

March, 1870.

Extracts from a Memoir intituled 'A Monograph of the Alcidæ.'

By ELLIOTT COUES, A.M., M.D.

(Continued from Zool. S. S. 2091).

Genus CERATORHYNCHA, *Bonaparte*.

Base of upper mandible with a large upright horny protuberance. Under mandible with an accessory corneous piece interposed between its rami, near their symphysis. Bill shorter than the head, stout, very deep at the base, tapering rapidly to the tip, much compressed, the sides erect, smooth, the culmen very convex, the rictus gently curved, the gonys nearly straight, except at symphysis, where it is bulging. Nostrils short, linear, subbasal, marginal, impervious. Eye small; no palpebral appendages. No crest; no furrow behind the eyes; slender elongated feathers on each side of the head. Inner lateral claw of usual size, shape and position. Other details of form almost exactly as in Fratercula. Size large; general form robust.

This curious genus may readily be distinguished from all others of the family by the characters indicated in the two first sentences of the above diagnosis. The intercalation of an accessory corneous element at the mandibular symphysis is an entirely unique feature in this family. It seems very much like the "interramicorn," as the writer has elsewhere called it, which is found in the albatrosses, as one of the characters which distinguish those birds from other Procellariidæ. In the present instance, it is a feature of especial importance and value, as it helps greatly to distinguish this genus from Sagmatorrhina, or, to be more explicit, to separate S. Suckleyi from C. monocerata in every stage of growth.

The affinities of this genus are decidedly with Fratercula, after Sagmatorrhina, of course. Apart from the peculiarities of the bill, it agrees with the former in most points of structure, except the eyes and inner lateral claw. It does not require comparison with any other genus. It is represented by only a single species, according to the writer's way of thinking,—Suckleyi falling most naturally, as well as can be judged at present, in Sagmatorrhina.

Ceratorhyncha monocerata (Pall.), Cass.—Habitat: American and Asiatic coasts and islands of the North Pacific. Japan (Perry's U. S. Expl. Exped.), Kamtschatka (Mus. Acad., Philada.), Pacific coast of N. A., from Russian America to Farralone Islands, Cal. (Mus. Smiths. Inst.). Breeds as far south as Japan and California.

Adult, breeding plumage (No. 46,517, Mus. Smiths., female, Sitka, May, 1866).—Bill orange-yellow, culmen and base of upper mandible dusky; horn dull yellowish. Feet apparently dusky yellow; below, with the tarsi posteriorly, blackish; claws black. Crown of head, back of neck, and entire upper parts glossy blue-black. Sides of head and neck, and of body along under the wings to the flanks, with chin, throat and upper part of breast, and under surfaces of wings, clear grayish ash, pretty trenchantly defined along its line of junction with the black. Under parts from the breast pure white; this colour shading insensibly into the ashy on the breast and sides. A line of white along the edge of the fore-arm. Exposed portions of wing and tail-feathers black; their inner webs grayish brown, basally lighter, the shafts of the primaries dull whitish at base. A series of elongated, stiffish, acicular feathers on the side of the head from the rictal angle; another similar series from the eye backwards to the sides of the nape, pure white. The individual feathers are about an inch, more or less, in length; the length of the white stripes produced by them collectively is about two inches.

Length 15·50; wing 7·25; tail 2·50; tarsus 1·20; middle toe and claw 1·85; outer do. 1·70; inner do. 1·40; chord of culmen, excluding width of horn, 1·00, including it 1·40; rictus 2·00; gonys, including length of accessory piece, 1·10; height of bill from tip of horn to protuberance at symphysis 1·25; from culmen at base of horn to same ·80; nostril to top of horn ·75.

Immature, but with a perfectly developed horn, and accessory symphyseal piece (No. 23,391, Mus. Smiths., Straits of Fuca).—Colours somewhat as in the preceding; but the white of the under parts everywhere obscured by ashy-gray, which tinges the tips of the feathers, giving a marbled aspect to the parts, lightest on the middle of the belly, shading insensibly on all sides into the uniform ashy gray of the other under parts. Black of upper parts, especially on the head, with a decided brownish tinge. Only traces of the acicular white feathers on the sides of the head. Bill smaller than before; the horn, however, perfectly developed, rising nearly half an inch above the culmen. Rather smaller than the preceding; length between 14 and 15 inches, wing barely 7, bill along rictus 1·60, its depth at base, exclusive of height of horn, ·65.

Young (No. 23,392, Mus. Smiths., Straits of Fuca).—This specimen is just not quite fully feathered, patches of down adhering here and there. The bill is small and weak, hardly more than half the size of that of the adult: its general shape, however, is nearly attained. The base of the upper mandible is covered with a soft skin, about as far as the end of the nostrils. That part of the culmen formed by the ridge of this skin is sunken below the level of the rest. Unmistakable indications of the future horn are present, in a small knob on the ridge of this skin. In the present dried state this knob is shrunken, presenting the appearance represented in the plate. In life it was probably a small full rounded protuberance, rising a little above the level of the culmen. Between the mandibular rami, at the symphysis, there is a slight fold or ridge of skin, evidently the matrix of the future accessory corneous element. The upper mandible is mostly blackish; the lower dull obscured reddish. The legs and feet appear to have been coloured much like those of the adult. The colours of the plumage are precisely those of the specimen last described; the patches of down are smoky brown. There is no trace of white about the head.

Nestling, about 5½ inches long. (Farralone Islands. Mus. Acad. Philad.) All over smoky brown, lighter and more grayish below.

The horn of this bird, always present in the adult, and always indicated, even in the scarcely feathered young, as we have just seen, varies a great deal in the details of its size and shape. It is usually nearly upright, but frequently projects a little obliquely forward. Its average height is between four and five-tenths of an inch, measuring from the level of the culmen at the anterior edge of the root of the horn. The real roots of the horn begin a little above the nasal aperture; the nostril opening just beneath the lower edge. The horn is thus bifurcated, as it were, at the base, and saddled on the base of the upper mandible. The anterior outline is usually straight, or slightly curved, the apex rounded, and the posterior border irregular in outline. It would be impossible to indicate all the variation in detail; scarcely two horns are precisely alike.

The frontal feathers ascend a very little way up the back of the horn in the majority of instances; sometimes, however, they end abruptly at its base. From their foremost point they sweep downwards and backwards along the side of the upper mandible with a gentle regular curve, to the rictal angle, leaving the tomial edges of the upper mandible bare. The chin feathers begin at the accessory symphyseal piece, rise quickly on the sides of the under mandible, and reach its tomial edge in advance of the rictal angle.

The symphyseal piece, which is developed from the skin of the apex of the interramal space, is, when fully formed, as hard as the rest of the bill. Anteriorly it is directly continuous with the mandibular symphysis. On its sides, a groove indicates its line of cohesion with the mandibular rami. The horn, when mature, is perfectly corneous and hard to its extreme base; there being no soft skin even about the nostrils. Its main shaft is hollow; a tube is disclosed when the top is worn off or broken off.

The white feathers on the side of the head differ from those of other Phaleridines (except S. Suckleyi) in not being very slender, filamentous and wavy. They are straight, short, acutely pointed, stiffish, standing discreet from each other, like so many narrow spear-points.

The very large series of this bird examined warrants the belief that the horn is always present, accidents of course not considered; that it begins to be apparent even before the bird is fully fledged, as a slight knob. That, in like manner, the accessory symphyseal piece is always developed; and that its beginning may be detected at a very early age. These facts must be borne in mind in discussing the unusually interesting points connected with Sagmatorrhina as compared with the present genus. The opinion relative to the seasonal or sexual character of the horn (page 905, Birds of N. A.)* would probably not have been expressed, had the writer enjoyed the opportunity of examining such an extensive series as has been at command in the preparation of the present monograph.

Genus SAGMATORRHINA, *Bonaparte.*

"Bill twice as long as high, upper mandible straight at the base, covered with a very large cere, incurved at the tip; lower mandible ascending immediately beyond the middle, forming an obtuse angle; nostrils linear, marginal."

The above is a translation of the diagnosis of a genus framed by Bonaparte for the reception of a bird he calls S. Lathami. It apparently differs from Ceratorhyncha in the contour of the bill, the presence of a soft cere saddled on the base of the upper mandible in the place of a horn, and, it may be presumed, in the absence of the peculiar accessory corneous element at the mandibular symphysis, as no mention is made of such a character. The type and apparently only known specimen is in the British Museum.

The possession of a soft flat cere in place of an upright horn, and the want of the accessory mandibular piece, are precisely the features which characterize Cerorhina Suckleyi, *Cassin*; and in fact are about the only ones by which the latter can satisfactorily be distinguished, specifically, from C. monocerata. It therefore seems a procedure of obvious propriety to refer Suckleyi to the present genus. At the same time Suckleyi can by no possibility be confounded with Lathami; nor is the latter by any means a young C. monocerata, as some authors have ventured to hint, and others have boldly assumed.

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* Spec. No. 10,698, there enumerated, seems to have called forth the remark above alluded to. This specimen, however, is believed to be the adult of S. Suckleyi, of which only the young bird was at that time recognized.

Sagmatorrhina Lathami, Bonaparte.—"Largest among its allies; blackish, beneath pallid fuliginous; bill and feet red; cere and webs black. Length 16 inches; bill 2 inches long, 1 inch high, five-eighths wide at the base, three-eighths in the middle; wing 7½ inches; tail 3½; tarsi 1¼; longest toe 2 and 3-eighths inches."

Habitat: "North-west Coast of America."

"This species is the largest of the subfamily, which is well known to contain the dwarfs of the water birds: it is one-third larger than Ceratorrhina monocerata, of which it has precisely the colouring, wanting only (at least in the state we have it) the little white feathers above the eye and at the corners of the mouth. The proportions of the wings, tail, feet and toes are the same; the bill and toes must have been reddish; the cere and membranes black. Like the Ceratorrhina, it seems to be confined to the north-western Arctic region of America; and we are led to believe it does not extend to the Siberian shores, from the circumstance of its not having been noticed by Russian naturalists."

The preceding is Bonaparte's notice of the species, containing all that is known about it by American ornithologists. The writer takes pleasure in acknowledging his indebtedness to Dr. P. L. Sclater, of London, for a figure, drawn from the type specimen in the British Museum. Dr. Sclater says very positively that the bird is a perfectly valid genus and species. Independently of the difference between the cere and the horn, the shape of the bills of C. monocerata and S. Lathami are quite diverse. The dimensions of the latter are much larger than those of the former.

Sagmatorrhina Suckleyi (Cass.) Coues.—Habitat: American and Asiatic Coasts of the Pacific. Spec. in Mus. Smiths. Inst.—Young (type of the species, Puget Sound;) adult, breeding plumage (San Diego, Cal.) Adult (Hakodadi, Japan.)

Adult! breeding plumage! (No. 31,908, Mus. Smiths., female, San Diego, Cal. Feb. 3, 1862, J. G. Cooper). "Iris white; bill black and orange; feet pale yellow, black below" (label.) Bill now obscure yellow, the culmen and basal membrane blackish. Feet dull whitish; tarsi behind and feet below blackish; claws black. Colours of the plumage almost precisely as in the adult monocerata; white feathers on sides of head exactly the same. Breast rather deeper grayish ash, the colour extending a little further, and more abruptly defined against the white of the other under parts.

No vestige of a horn at base of upper mandible; this being covered with a soft skin, overlapping the culmen, extending to the nostrils, which open beneath its lower border. That part of the bill occupied by the membrane is depressed below the level of the rest, both on the ridge and sides. The membrane is shrunken and shrivelled in its present state. There appears to have been a slight tumidity, in the fresh state, of this membrane, just on the ridge, which may have elevated it to the level of the rest of the culmen, and which could possibly even have been inadvertently called a "knob" by one who regarded it as the beginning of a horn. No trace of an intercalated piece between the mandibular rami, which have thin, sharp, smooth edges, and come together in a fine point at the symphysis. Bill much smaller, weaker, and particularly less deep at the base than that of C. monocerata; but not much shorter, nor comparatively even so much compressed as in the latter bird. Culmen regularly decurved from base to tip; the latter moderately overhanging; rictus at first nearly straight, then gently declinate; gonys nearly straight, slightly concave; outline of mandibular rami about straight.

Decidedly smaller than monocerata; the wing comparatively longer. Length about 14·00; "extent 25·50" (label); wing 7·25; tarsus 1·10; middle toe and claw 1·90, outer do. 1·80, inner do. 1·45; bill—chord of culmen 1·30, of which the membranous part is ·30; rictus 1·85; gonys ·75; depth of bill at base ·60; its width at same point ·45.

Young: "Membrane at base of upper mandible grayish dusky black; middle of both mandibles dingy orange, their tips dusky; iris pale hazel; under surface of the webs of the feet, and the posterior aspect of the tarsi dusky black; upper surface of the toes bluish white, darker about the articulations; nails black." (Suckley, l. c.).

Much smaller than the adult; length "about 12·50; extent 24·00" (Suckley, l. c.): wing 6·50; tarsi 1·00; tail 2·00; tarsi 1·00; bill along culmen 1·20, of which the membranous portion is ·30; along rictus 1·60; along gonys ·60; its depth at base ·40. The bill is small and slender; its general shape calls to mind the bill of a young gull of one of the smaller species. The several outlines, particularly that of the culmen, are straighter than in the adult; the tip is less decurved. The bill is much longer, relatively and absolutely, than that of the corresponding age of monocerata; it is comparatively more slender.

There is no trace of a knob;* the membrane has precisely the same characteristics as that of the adult bird above described. There is no trace of an accessory piece between the rami.

The bird above described was first indicated as a distinct species by Mr. Cassin in 1858; that gentleman founding his specific characters mainly upon the small size, somewhat darker colours, and much smaller, slender bill, as compared with monocerata. The species has always been looked upon with considerable mistrust, and very generally regarded as only a young monocerata. At the time of the introduction of Suckleyi, C. monocerata was not known in all its ages and stages of plumage, as it is at present. The horn which characterizes it was believed to be frequently wanting, particularly in the young bird. The accessory symphyseal piece had not received attention. These facts, together with the almost perfect identity in plumage of the two birds, very naturally led to the suspicion above mentioned; seemingly borne out, too, by the fact that the type of Suckleyi was a very young bird, the adult of which was unknown, or at least unrecognized. But it has been shown in the preceding article that indications both of the horn and of the accessory interramal element appear in monocerata even before it is fully feathered, and that these two distinguishing features are preserved in all ages, at all seasons, with both sexes. The discovery of Suckleyi in perfectly adult breeding plumage settles the question of its identity with monocerata. Specimen No. 31,908, above described, has no trace of a horn or accessory symphyseal piece; and is smaller, and otherwise conspicuously different from monocerata, though of almost precisely similar colours of plumage.

There is something highly interesting, very singular, and, with our present information upon the subject, totally inexplicable, in the fact that the plumage of the two birds is so nearly identical as not to be satisfactorily distinguished in any particular; while the bills differ in such radical characteristics. The suspicion comes unbidden, that the whole truth in the matter of C. monocerata, and S. Suckleyi—and S. Lathami, too—remains to be developed; while it is certain, at the same time, that nothing but the truth appears upon these pages.

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* Dr. Suckley (l. c.), speaking of this specimen, uses the word "knob" in connection with it. His expression is to be taken as indicating merely the turgidity of the soft membrane during the life of the bird; which raises the membrane to or above the level of the rest of the culmen. The membrane, being very soft, shrinks and shrivels in drying, and the prominence disappears.

In the reference of this species to the genus Sagmatorrhina, the writer is guided simply by Bonaparte's diagnosis, and by the figure of the head of S. Lathami, kindly furnished by Dr. Sclater. The dimensions of S. Lathami and the form of the bird are sufficient to distinguish S. Suckleyi from it.

(To be continued.)

The Protection of Birds. By Captain H. W. FEILDEN.

IF you do not think that I am trespassing beyond the limits of a contributor to a periodical of Natural History, I should much like to bring to your notice and to the notice of the readers of your valuable journal my views as to the great protection likely to be afforded to the avi-fauna of Great Britain, from the proposed tax of the Right Hon. Robert Lowe on the carrying of fire-arms. I am not going to discuss the imposition of a one-pound license on fire-arms from any other stand-point but that of a lover of bird-life, who derives true enjoyment from out-of-doors observations of animal life: writing from this basis, I feel sure that I may rely on the sympathies of your readers.

It is evident to those who have made field Ornithology a pursuit for any considerable time, that many of our native species of birds are becoming yearly scarcer and scarcer. This is owing partly to the increase of population, and its attendant results, but far more I contend to the great increase of idle gunners, who for the mere pleasure of discharging their gun or for the desire of petty profit, have been in the habit of indiscriminately slaughtering, in and out of the breeding-season, our feathered favourites.

The Sea-birds Preservation Act of last Session was a wise and kind measure in the right direction, and I think the proposed tax on fire-arms is another step forward, and will lead to the happiest results. That it will meet with considerable opposition from many quarters I have no doubt, and I take the following as an example from a leading article of the 'Times' of the 12th of April:—"While the argument that the tax may check poaching in the bud may be sufficiently acceptable in the House of Commons, its practical consequences that no schoolboy can have a day's shooting at Christmas without paying a pound for a license is likely to excite a storm of unpopularity." The *unfortunate* school-boy of the 'Times,' who is now to be ruthlessly deprived of his innocent amusements at Christmas time, is in my estimation only a stalking-horse put forward to cover and protect the acts and delinquencies of that class of pot-hunters who swarm throughout the country, and are the bringers to market of the bundles of song-birds that we see every day suspended from the shops of the small game-dealers in our towns. To these heartless wretches a nightingale would be no more sacred than a starling. I would therefore suggest that all lovers of Ornithology should unite in protesting against this mock sympathy for the imaginary school-boy, a sympathy which is sure to be developed by such newspaper articles as I have referred to, and aid by discussion and argument the carrying out of this beneficial tax on fire-arms.

Mr. Robert Gray, the Secretary of the Natural History Society of Glasgow, in his concluding remarks on the "Birds of Ayrshire and Wigtownshire," published in the Proceedings of that Society for 1869, writes ably and forcibly on the subject of the preservation of our birds:—"We cannot withhold the expression of a belief, in which we trust that most persons interested in ornithological pursuits will readily join, that the time has now arrived when the protection of various classes of birds has become a paramount duty. We have only to consider the vast diminution of species that has taken place during the last thirty years, in order to learn the mischief that has resulted from one cause alone—*viz.* the over-zealous destruction of creatures that are supposed to be enemies to game. * * * We still cling to the hope that similar enactments (referring to the Act for the Preservation of Sea-birds) may yet be framed for the protection of land birds, from the soaring eagle to the timid thrush; and until this takes place, proprietors would earn the gratitude of all true naturalists by resolving to discontinue the deadly practice of exterminating what their keepers have branded as vermin."

Still referring to Mr. Robert Gray's admirable paper, I find that Section VI. of the Laws of the State of New York provides for the protection of a large number of land birds, including the eagle, fish hawk, night hawk, whip-poor-will, swallow, oriole, woodpecker, bobolink, *or any other harmless bird.* The penalty for violating the provisions of this Act is stated at fifty dollars for each offence. Thus we see that in the Republican States of the New World the protection of birds is more cared for by the statute book than in England.

The deductions which I wish to make from these remarks will not I think be gainsaid by your readers, namely, that the diminution of many of our species of birds, and the destruction and extermination of others, is due to two principal causes—"the over-zealous destruction of creatures that are supposed to be enemies to game," and the merciless slaughter of our birds by the hedge-row pot-hunters.

A third cause is one that springs directly from a wise and proper origin, but one which I am afraid is often carried to an extreme—a desire to add to our ornithological knowledge by procuring specimens for our private collections. Almost any number of your interesting and valuable magazine is largely filled up by a record of "rare captures," which in too many cases amounts to the total destruction of the flocks of rare visitors who may have been unfortunate enough to land on the shores of Great Britain. What I want to ask is this. Can we not do something to stem the tide of destruction? Would it be feasible or beneficial to endeavour to form throughout the country a Society for the protection of birds in general?

I think the Sea-birds Preservation Act will sufficiently protect those species if the law is carried out in its integrity, and I am looking forward with great interest for this season's report, whether the sea fowl have increased at Flamborough and other English nurseries of rock birds. I trust that contributors to the 'Zoologist' will pay attention to this, and record the result of their observations.

I think that Mr. Lowe's proposed tax on fire-arms will in a great measure obliterate the worthless senseless destroyers of our song-birds and smaller land birds. There will still be left to contend with a large class of persons who have the power to destroy and exterminate species, but, I am happy to say, a class amenable to reason and open to conviction, and who doubtless, as the subject is more fully ventilated, as it soon must be, will lend their powerful support to the protection of birds—I mean the proprietors of Great Britain. There are several proprietors of my acquaintance who lend a willing and kindly hand to the good cause of the protection of bird-life, and as a growing interest in this matter appears to be springing up, I look forward to the time when this feeling will be paramount throughout the length and breadth of the land. I am afraid that my love for the subject on which I am writing may lead me to occupy too much of your space, and to impose on the patience of your readers, but if the remarks now penned by me in one single instance restricts the useless destruction of a bird, they will not have been written in vain.

H. W. FEILDEN.

Chester Castle, April 14, 1870.

Australian Frugivorous Bats, or "Flying Foxes."

SUDDENLY, in 1858, an unusual number of flying foxes was observed one day to be hanging on some trees in the Botanical Gardens in Sydney, New South Wales. Such animals had been but rarely seen in the neighbourhood, though since that year they have often appeared in goodly numbers. They are thickly congregated in some places up the country, especially in the warmer regions towards the north, and it is perhaps only during the prevalence of severe droughts that they migrate towards Sydney. At such periods they find all the wild fruit up country dried up, and burned both by the sun and by bush-fires; whereas near Sydney they meet with many orchards and gardens where, thanks to human aid, luscious pears and great fat peaches thrive, drought or no drought.

There are several species of these bats; but that most common about Sydney is the Pteropus Edwardsii. Its wings measure over three feet, from tip to tip, and it is clothed in a dusky thick fur, with a reddish ring around the throat. It has a curiously benign expression of countenance, though masking a savage disposition, especially when wounded.

Like most of the aboriginal denizens of Australia, these foxes are nocturnal in their habits. Owing to the great area of the extended wings, even the darkness of night does not render it a difficult matter to hit them. They are brought to the ground with much more ease than a bird would be. Flapping its huge wings as it lies there on its back, in the dark, such game completely puzzles any dog; and should one chance to get its nose in, he is probably saluted by a severe nip from the beast's teeth, while at the same moment he is startled by sharp scratches on his back and neck from the formidable hooks on the "shoulders" of the wings. If no dog be near, and a sportsman has only wounded one, he lies flapping for a time, until, recovering his presence of mind, he makes off, with a shuffling, undignified waddle, slow but sure, to the nearest tree, which he then ascends somewhat rapidly.

These huge fox-bats do not appear to be able to take flight off the ground, but are obliged to commence their aërial tour by dropping from some branch, in the same way that an albatross starts by throwing himself off a cliff. They are blessed with good appetites, and, though most partial to fruit, they will even condescend to nibble the flower of the gum tree, &c. They are most clumsy eaters, destroying far more fruit than they "put away." It is amusing to hear the fruit growers persist in declaring that the foxes do this wilfully, from malice prepense, from the evilness of their hearts, whereas to us it appears to be rather the result of laziness than of diabolical mischief. Certain it is that the morning after they have visited an orchard large quantities of nibbled fruit are found all over the ground. Hanging by his hind legs, the flying fox takes hold of a pear or a peach with his claws, and as long as he can comfortably reach the fruit, so long does he munch away, through stalk and all, when of course the pear at once proves the law of gravitation to any Newton chancing to be near, and the bat lazily crawls off to another. It is possible, though not proved, that the bat on losing his dainty morsel makes use of bat-like naughty language; at all events, he tries to solace himself by swinging or crawling off to the next fruit within reach, of which the better part is again soon on the ground. They have been known to carry fruit to a great distance in its whole state, besides the pulp which they concoct in an internal receptacle and give on their return home to their wives and children.

During the day the Pteropi sleep suspended by their hind legs from tall trees. In India they usually select some species of Ficus, and may be seen covering the branches of several consecutive trees, which are soon stripped of all their leaves. The effect is very curious when the bats are in such numbers; the trees from a distance look as if they were clothed in black foliage, large hanging dark leaves pendant along every branch, but which, on a nearer approach, prove to be these sleeping bats. They are fond of home, keeping steadily to the same trees for years, if not hunted away. It is interesting to watch them waking up in the evening. Towards sundown, one or two of them begin to stir; one wing begins slowly and by degrees to unfold itself; then a second wing is gradually extended. A chattering, squeaking, murmuring waking-up becomes general; one by one they commence crawling about, then fight a bit to raise their dormant faculties, and after trying their flying powers round and round the trees, at last, fully awake and alive to the duties of the night, they make off to their various feeding-grounds.

All these bats hang to the branches by the claws of their hind legs, and they possess another useful member in the hook, which appears to be attached to the shoulder of the wing, but which really answers to our thumb, and which is their great stay when climbing or feeding.

So tightly do they hang by the claws that they may even be shot dead and yet not drop, obliging their persecutors to climb the tree to gain possession of the dead body. They have a peculiar odour, in spite of which the blacks eat them, and declare them to be savoury and palatable. Dr. Leichardt and his party, when crossing the continent of Australia, found them good eating. But was this possibly a case of Hobson's choice?

There is a little bird, called by the colonists the "silver-eye," which likewise shows much taste for fruit, doing a deal of damage according to its smaller powers, but nothing when compared to that occasioned by the ravages of this huge bat.—*George Smyth Powell; New South Wales, February,* 1869.—*From the 'Field.'*

The 'Singleton Times' also gives the following account of a recent exterminating expedition to the haunt of the flying foxes at Black's Mountain:—

After hobbling our horses with a stirrup-leather on some good grass on the top of the mountain, we proceeded down its rather precipitous sides, and soon our eyes were as much astonished as they were gladdened by the sight of many acres of trees literally black with foxes. More than half of our company commenced operations; but after about a quarter of an hour's tremendous slaughter we had the mortification to see that nearly every one of the flying foxes was on the wing, and a wonderful sight it was. The bush was about a mile and a half long, and the whole length and breadth of it was nothing but a vast cloud of foxes, wheeling and hobbling, and "bobbing round" and round. At the lowest calculation there could not have been less than fifty thousand, and I believe that if that number were doubled it would be nearer the truth. Our party had by this time got pretty well spread all over the ground, and for some time, wherever two or three of the foxes tried to fasten on a tree, they quickly came to grief, and some of our party brought them down on the wing. This exciting state of affairs lasted until a little past noon, when the call sounded of "Come to camp." The call was quickly complied with, and ample justice was done to the eatables provided. After half an hour's rest, away we started, and now "the fun grew fast and furious." The foxes were completely tired with their unusual exertions of the morning, and would only fly from tree to tree, and in many instances from one side of the tree to the other; and all that the sportsmen had to do was to load and fire, which they did as fast as their guns would allow them, many of them having to apply wet handkerchiefs to their guns, which they rubbed to keep cool, being afraid they would blow the powder off while they were loading; but it would be impossible to give you any idea of the shooting done for the next few hours, or of the wild enthusiasm which was felt by nearly all the party. But, like every other enjoyment and excitement, even that must come to an end; and shortly before five o'clock, knowing the distance we had to return home, and the darkness of the night, with one accord we turned homeward.

Change of Colour in Stoats this Winter.—The number of stoats which have this winter assumed more or less the ermine clothing on the hill in this place is very remarkable. My under gardener has seen several thus changed, and the woodmen at work there state that they have not seen one wholly in its brown garb. One which was brought to me this morning is almost wholly white, and another, now in the hands of the stuffer, has no trace of its summer colour. No person here has ever seen so general a change in the species before. Our latitude is about 51°.—*Thomas Bell; The Wakes, Selborne, March* 19, 1870.—'*Field*.'

Supposed Occurrence of the American Mottled Owl at Cobham, Kent.—I think I can hear a groan of suspicion from experienced ornithologists when they read the bold statement that I have seen this rare American owl in England. "Where is the specimen?" they say, "seeing is believing." Well, I have not got the specimen, but I had a most clear view of the bird, and I will endeavour to describe it to the readers of the 'Zoologist.' On the 11th of April I was examining a large yew tree that stands in a thick wood here, having an idea that there might be an owl of some sort there. To my surprise I perceived, about six feet above my head, a beautiful little owl, which struck me as being a nondescript. The general colour was reddish brown, beautifully variegated; on the wings were several large and conspicuous white spots (characters of Strix Asio and no other English owl); the breast was dotted with longitudinal markings; the feathers of the face were much redder than those of the breast; and, to crown all, it had two small stumpy tufts—I can hardly call them ears. After it had surveyed me for a minute or two, with a ludicrous expression of dismay, it flew rapidly off to some larches, where I found it again perched up against a trunk, and had a still better view. I forgot to say that in size it seemed a little larger than a partridge. By careful examination of stuffed birds of known length, and especially owls, I conclude that its length was about eleven inches. What else could this be but Strix Asio? It was too big and too red for a Scops, too small and shorteared for a longeared owl. Besides, neither of these species possesses the conspicuous white markings on the wing. I submit the case confidently to the readers of the 'Zoologist.' —*Clifton; Cobham Hall, Gravesend, April* 12, 1870.

Lesser Gray Shrike in Norfolk.—With reference to the Rev. M. A. Mathew's statement in the last number of the 'Zoologist' (S. S. 2060) that he received an example of Lanius minor, recently obtained in the neighbourhood of Yarmouth, I may add that, from inquiries made on the spot, I feel justified in adding this species to the Norfolk list, through the occurrence of Mr. Mathew's specimen. The bird in question appears to have been shot in the spring of 1869 (the exact date I cannot now ascertain), in a garden at the north end of the town, and was purchased and mounted by Mr. Carter, a local birdstuffer, who subsequently sold it to Mr. Mathew. It is quite evident, however, from the price asked for it, that its specific rarity was unknown until its distinctive markings were recognized by its present owner.—*H. Stevenson; Norwich, March* 23, 1870.

Buff-coloured Redwing.—Buff varieties of the blackbird and thrush are not uncommon, but I think a buff redwing is rather a novelty. A bird of this kind was lately killed near Plymouth, showing no trace of the usual markings, save the red patch on the side, which is of a much paler shade, though still very conspicuous.—*John Gatcombe; Stonehouse, Plymouth, April* 17, 1870.

Golden Oriole at Scilly.—I have to communicate to you the appearance of the golden oriole in large numbers at Trevethoe, about seven miles from Penzance towards the north coast. Mr. H. Manners, jun., was good enough to bring for my inspection, this morning, two adult specimens, a male and female, in the finest possible plumage. He said he shot them out of a flock of eight last evening, and that they were distributed over a plantation where a considerable quantity of high gorse prevails, in large numbers; he says at least forty. This is a rather remarkable immigration of this fine and rare British species.—*E. H. Rodd; April* 22, 1870.

PS.—As I fully expected, after the immigration of orioles in this district reported to you yesterday, I received by the Scilly Packet to-day news of their appearance on the islands. One was picked up dead, and four others seen in bright plumage at "Trescoe" Island, another, apparently a female, on "Sampson." I observe that the female is of rather larger dimensions than the male.—*Id.; April* 23, 1870.

Black Redstart.—During the past winter I have met with six specimens of the black redstart on our coast, five of which were in the plain gray plumage, but the sixth was a magnificent old male, with full black breast and pure white patch on the wing. This last bird I mentioned having seen in a previous notice, but since then it has fallen to my gun, and is now stuffed and in my possession.—*John Gatcombe.*

Correction of Errors.—In my note on Ruticilla tithys and R. Carii (S. S. 2100, line 10), my meaning is quite altered by the omission of "and" before "that," &c.: it should read, "I think, contrary to Dr. Bree, *and* that it would make a very great difference, R. Carii and R. tithys breeding in distinct localities, particularly in the same place and at different levels." Also, in my note on the ruddy sheldrake near Tralee (S. S. 2105), read "bogs" and "bog" instead of "bays" and "bay" throughout.—*H. Blake-Knox.*

Wheatear on the 5th of March.—I observed several specimens of the wheatear on Durdham Down, near this place, on the 5th of March. As this species does not usually make its appearance in this locality before the end of March or beginning of April, you may consider its early arrival, especially in the present rather backward season, worthy of record.—*Marcus S. C. Rickards; Clifton, March* 24, 1870.

Bird's Nest in Solid Wood.—A curious discovery has recently been made at Chislehurst, in Kent:—"A large elm tree in the church-yard was cut down, and a bird's nest with seven eggs was found completely embedded, and having at least nine inches of solid wood grown over it, without any trace of an outlet. The eggs are as perfect as when first laid, and are supposed to be those of the great titmouse (*Parus major*).—*J. E. Anderson; Henlade, Taunton, April* 22, 1870.

Shore Lark near Newhaven.—On Tuesday, March 1st, a fine specimen of the shore lark was taken at night in a lark-net, on the Hoddern Farm, near Newhaven.—*T. J. Monk; Mountfield House, Lewes.*

Shore Lark at Southwold and Redthroated Diver in London.—Mr. Cooper, of Radnor Street, St. Luke's, showed me to-day four shore larks, which had been shot at Southwold, near Aldborough, Suffolk, at the beginning of March. He had also set up a redthroated diver, which had settled during the severe weather in February on the reservoir of the New River Company, Clerkenwell. The bird lived on the water for some days. On examination after death the bill was found to have been injured by shot, and turned up to such a degree as to completely prevent the bird feeding, thus causing death by starvation.—*A. H. Smee; April* 18, 1870.

Snow Bunting on the Severn Bank.—I yesterday shot two specimens of the snow bunting on the bank of the river Severn, between Avonsmouth and the New Passage. They were associating with a flock of larks, and were very wild and difficult of approach. Both specimens proved on dissection to be females, and are in good plumage.—*Marcus S. C. Rickards.*

Tree Sparrows near Oxford.—Since I last wrote you, the little tree sparrows (*Passer montanus*) have arrived in quantities, and they are daily frequenting our withy pollards, in which they appear to make their homes. I am much interested in their movements, and am watching them closely. Are they supposed to be migratory? I see they are mentioned in the 'Dictionary' as being local, confining themselves to Lancashire, Yorkshire and Lincolnshire: they are now very plentiful here.—*Edward Sweetapple; Eynsham Paper Works, near Oxford, April* 9, 1870.

[I have never regarded Passer montanus as migratory: it is resident throughout the year at Leominster.—*E. N.*]

Immigration of Rooks and Starlings.—During the past week the wind has been frequently shifting from east to west, and on Thursday, the wind being N.W., immense numbers of rooks and starlings were almost constantly arriving from over the sea under similar circumstances as occurs in October. I have never seen such flights at this season of the year before, and think it so exceptional as to deserve to be noted. —*N. Fenwick Hele; Aldeburgh, March* 20, 1870.—'*Field.*'

Note on the Migration of Swallows.—My father, who is at present travelling in Italy, writes to me that a few swallows made their appearance at Naples on the 28th of March, but none were seen at Florence before the 31st of March: by the 10th of April, however, swallows were abundant. In this country (Carshalton, Surrey) the first swallows were seen on Sunday, April 10th, one day later than last year. On that day only four were seen, and up to this present time (April 19th) they are very few in number, and as yet neither the sand nor common house martin has appeared. A correspondent writes in the 'Field' of April 9th that swallows were seen on the Garonne on the 29th of March. My object in recording these isolated dates of the first appearance of the swallow is the hope that I may induce ornithologists in this and other counties traversed in their migrations to carefully watch for and record the date of the first appearance of these birds, so that some idea may be obtained of the cause which influences them to undertake their migration north, and also the distance traversed per day when so migrating. I have an idea that we shall find that the distance traversed is very limited and much smaller than is popularly believed. From the above dates the swallow appears to fly about fifty miles per day, in a northerly direction.—*A. H. Smee.*

Mr. Hamond's Bustards.—Allow me to correct an error in the last number of the 'Zoologist' (S. S. 2102) respecting the late Rev. Robert Hamond's case of bustards. These birds, forming part of a fine collection, are now in the possession of a relative of the late Miss Hamond, of Swaffham,—Mr. Robert Elwes, of Caugham House, near Lynn, and were never, as Mr. William Dugmore supposes, in the possession of the late Mr. Anthony Hamond, of Westacre. I have recently seen this fine case of bustards at Caugham House, and believe that Mr. Moor's account of them is correct; but as I expect shortly to have an interview with an old gamekeeper in this county, formerly in the service of the Rev. Robert Hamond, and who was with him on most occasions when he went after bustards or other specimens for his collection, I shall probably be able to authenticate or add fresh facts to Mr. Moor's statement. The collection now at Westacre belonged to the late Rev. H. Dugmore, of Beachamwell, Norfolk.—*H. Stevenson.*

White Curlew and White Fieldfare.—About a month ago a pure white curlew was shot near Carrigart, in county Donegal, and sent to me for stuffing. This bird had been seen in the same locality for two years by the man who shot it; and is now in the possession of John Bond, Esq., of the Collow, near Derry. Not long since, a gentleman told me he had shot a pure white fieldfare not far from this city.—*Thomas E. Davies; 24, Strand Road, Derry.—'Field.'*

Woodcock on the 19th of March.—I noticed in the 'Field' newspaper that a gentleman had seen a woodcock on the 8th of March, and he considered it very late for them. On Saturday, the 19th, I shot a remarkably fine one, but I omitted to have it weighed· It was in splendid plumage, and very light coloured.—*H. P. Brandreth; Standish Rectory, April* 6, 1870.

Jack Snipe in a Norwood Garden.—Last Monday morning (April 4th) I flushed one of these birds in my garden. It was sitting under a fence, and rose at the distance of about two yards, so that I had a good opportunity of distinguishing the species. I live on the crest of Beulah Hill, Upper Norwood, which is about the last place in which one would expect to meet with such a bird.—*Charles Horne.*

Garganey or Summer Teal at the Lands' End.—The garganeys visits us sometimes, but rarely, in the early spring, on their journey to the eastern counties, where they breed. Three specimens, in adult and beautiful plumage, were obtained on the 30th of March, and sent for preservation by Mr. J. Symons, jun., from the Lands' End.—*Edward Hearle Rodd; Penzance, April* 9, 1870.

Garganey near Lewes.—On Friday, March 25th, a garganey teal was shot in the marshes near Lewes: this proved to be an immature male, and when shot was in company with six others of the same species.—*T. J. Monk.*

Redbreasted Merganser in Adult Plumage in Winter.—I saw a full-plumaged merganser, which was killed in the middle of the late winter in this neighbourhood. All the specimens I have hitherto seen here (and they have occurred in the winter months), have been in the sombre garb of the "dun diver" figures. I have regarded this state of plumage as seasonal, as well as indicative of birds of the year, but the adult ornamental plumage of the specimen under notice induces me to suggest that if generally the less ornamental livery is the winter dress, very old birds may retain the full plumage perennially.—*Edward Hearle Rodd.*

Redbreasted Merganser near Oxford.—While looking for wild ducks during the late frost, I was lucky enough to shoot a fine male specimen of the redbreasted merganser. I found it near Oxford, between Sandford and Nuneham. Are they often found so far inland?—*G. O. Pardoe; Univ. Coll. Oxon.*—'*Field,' March* 5, 1870.

Rednecked Grebe and White's Thrush in Yorkshire.—I beg to communicate the facts of the occurrence in this district, first, of the rednecked grebe (*Podiceps rubricollis*), which was obtained about a month since on the upper part of the Cleveland Esk; and, second, of a bird which I have no doubt was White's thrush (*Turdus Whitei*). My attention was drawn to the last-named yesterday (Sunday) morning. It was on the grass-plat, not ten yards distant from my study-window, and I was enabled almost immediately to examine it thoroughly by the aid of a very excellent double field-glass. I suppose it was thus under observation from two to three minutes. Again, in the afternoon, from the same window, I had a like opportunity of inspection, and as the bird hopped across the grass it came under observation from another window, with nearly equal advantage to the observer. It remained in sight for, I should say, four or five minutes this second time. I had no doubt from the moment I caught sight of it that it was not a common bird, and directly I had it in the field of the glass I recognized the peculiar plumage of the Turdus Whitei. I see Eyton, in his 'Rarer British Birds,' speaks of the flight of Lord Malmesbury's bird as "undulating, similar to that of a misseltoe thrush." The remark of my eldest son, who first noticed the bird on the grass-plat, touching the flight of yesterday's bird, was, that it was "just like that of the missel thrush;" the spontaneous remark of another observer (quite un-ornithological), who stood by my side at the time, being, as regards its size, that it was so much larger than the common thrush, specimens of which are to be seen on the same grass at almost any time for the trouble of looking out of the window.—*J. C. Atkinson; Danby, in Cleveland.*—'*Field.*'

Horned Grebe in Cornwall.—Several specimens of the horned grebe (*Podiceps cornutus*) came to hand during the late hard winter, from different localities in West Cornwall. All the specimens that I saw were without elongated feathers or fringes, and were, I presume, either in the first year or in winter plumage.—*Edward H. Rodd.*

Grebes on the Coast of Devon.—Examples of the whole family of British grebes have been obtained on our immediate coast during the past winter. In a previous notice I mentioned the great crested and Sclavonian grebes, but since then specimens of the rednecked, eared and little grebes have come under my inspection, all killed in the neighbourhood of Plymouth. Many years ago large flocks of grebes, composed of different kinds (but chiefly of the great crested) frequented the shores of Plymouth Sound during a long continuance of severe easterly gales and frost, but since that time comparatively few have made their appearance until the late severe season. At the time they were so plentiful (mentioned above) my brother and I alone killed more than twenty specimens within a month, the skins of which we kept to have made into tippets or muffs; but not knowing how to divest them of the thick layers of fat, they became so rancid that we were ultimately obliged to throw them away.—*John Gatcombe.*

Bridled Guillemot and Little Auk.—The bridled guillemot and little auk have been lately killed in the vicinity of Plymouth.—*Id.*

Puffins in Mackerel Nets.—I have just received a specimen of the puffin captured at sea in a mackerel drift-net. This mode of capture of sea-birds is not uncommon. I have myself frequently taken cormorants and other divers in trammels (which are fixed bottom-fishing-nets), and I have once or twice mentioned it either in your pages or elsewhere, but the fact is one of the common ones not generally known, and I therefore record it.—*Thomas Cornish; Penzance, April* 12, 1870.

Hoopoe in Kent.—A hoopoe was shot on the 21st inst., at Lees Court, near Faversham; it was in fine plumage, but rather a small specimen.—*John Hunter; Ealing, April* 23, 1870.

Little Gulls, &c., near Great Yarmouth.—During the month of February, Mr. Carter has had the following rare specimens in for preservation, *viz.*, redbreasted merganser, shot on Breydon on the 12th; blackthroated diver, female, shot on Breydon on the 13th; smew, shot on Breydon on the 19th, and four little gulls. I may also mention that Mr. Watson has had brought him about twenty of the little gulls, some very old birds amongst them, all shot in this immediate locality.—*John G. Overend; Great Yarmouth, March* 2, 1870.—'*Field,*' *March* 15, 1870.

Little Gull, &c., near Marlborough.—A specimen of the little gull was picked up on Rockley Downs, near this place, on the 14th of February; one of the scaup duck was shot at Mildenhall, on the 15th, and a pintail also at Mildenhall, on the 26th.—*T. A. Preston; Marlborough, April* 1, 1870.

Blackheaded Gulls in Penzance.—Five or six blackheaded gulls, in full summer plumage, have been disporting themselves off our pier-head here to-day. They seemed perfectly aware that they were quite safe. They had probably been looking up the Act of Parliament and consulting an almanac before they came in.—*Thomas Cornish.*

Arrival of Summer Birds in the Neighbourhood of Plymouth.—Wheatear, March 5th; garganey, March 25th; chiffchaff, April 4th; swallow, April 11th; willow wren, April 12th.—*John Gatcombe.*

Notes from East Yorkshire.—January 15, 1870. An adult male peregrine falcon shot at Flamborough.

February 1. Saw a fine male smew: it rose from one of the drains on our common.

2. An adult female goosander shot on the river.

11. A male chaffinch shot near Cherry Burton, almost white.

12. Whilst up the river looking for wild-fowl I saw three goosanders flying about, evidently intent on pitching near a bend in the river: this I saw by their "stooping" in their flight, and always near the same place; at last they pitched, and I crept cautiously to them, and with such good result as to kill the male and a splendid female by a right and left shot: both adult birds, the salmon-colour on the breast of the female being richer than I ever saw, surpassing even that on the male. About a dozen immature goosanders of both sexes have been shot on the river this month. An adult male and female goldeneye shot on the river.

16. Rednecked grebe, female.

17. Smew, adult male, shot on the river.

20. Two Sclavonian grebes, female, shot by a bargeman.

21. Common buzzard, female, shot near Cocklington.

March 8. A Sclavonian grebe, adult male, shot by myself: the stomach of this bird was crammed with a mass of feathers, fish-bones, &c., much resembling the casting of an owl. Although this grebe appears to have occurred almost generally over England, I have not heard of a single specimen of the eared grebe having been procured. If the birds inhabit the same countries, how is this?

20. Two male garganey teals shot on the river.

27. A female blackbird sent me: it had a white patch of feathers on the back and neck, and a few on various parts. Female varieties are not nearly so common as those of the male.

31. A male and female garganey teal shot.

April 1. I picked up a fine bean goose on our common to-day: it had been wounded the evening before. Saw a woodcock this day.

2. A male garganey teal shot on the river.

3. A ruff shot on the river-side: it had moulted some dark feathers on the back, and had a large white collar on the neck, but the feathers were only short. Stone plovers have arrived on their breeding-grounds.

5. Two green woodpeckers shot near Holme.

8. Found a longeared owl sitting on an addled egg: it had evidently been sat on a long time.

15. A pair of shovellers, male and female, shot on the river.

16. A redthroated diver, shot on the Humber near Spurn, had not completed its red throat.—*Frederick Boyes; Beverley, April* 20, 1870.

Rare Birds at Barnstaple.—The following birds have been obtained at Barnstaple since my last communication:—Another rednecked grebe, shot on the Taw towards the end of February; a pair of garganeys, male and female, shot on the Taw, close to Barnstaple Bridge, about the 20th of March; and a pair of shovellers, shot on the Taw, about the same date. A fine great gray shrike was seen close to the town towards the end of last month.—*M. A. Mathew; Barnstaple, April* 8, 1870.

Greater Forked-beard at the Land's End.—A specimen of the greater forked-beard, or hake's dame, was taken yesterday in a mullet-sean at the Land's End. There is nothing remarkable about the fish, which was about eighteen inches long. The last (indeed the only other) specimen I ever saw was taken in Mount's Bay in 1864.—*Thomas Cornish; Penzance, April* 9, 1870.

Large Salmon in the Tame.—Yesterday a salmon two feet nine inches long, and weighing eight pounds, was taken in the eel trap, at the Castle Mill, on the River Tame, just by the spot where it is joined by the Anker. Unfortunately it had been eaten by the captor some two hours before I heard of it, and I could not therefore see it in the flesh, but I understood the mill-owner to say that it had on its lower lip the horn with which these fish root up the gravel before spawning. It is now many years since a salmon was taken so high up the river as this.—*Egbert Hamel; Tamworth, April* 6, 1870.

Something about the Viper.—On the 7th of April, when in Maidstone Wood, in the parish of Egg Buckland, about four miles from Plymouth, I found to my surprise a young viper at rest on some dead leaves, &c.: I should not have supposed young ones would have been produced so early in the year as this. I killed it, and, as I had my botanical vasculum with me, brought home the body in it, and on measuring it found it only just exceeded seven inches in length. The habits of some of our British Reptilia seem so little known, notwithstanding the list is so meagre, and, as regards the viper, so much has been said about the retreating of its young when alarmed through the dam's mouth into her stomach, that the simple fact of my finding a young one at the date given seems to me worthy of notice, especially as the length of this little creature, albeit it was at large in the world, was only that of the shortest of a young brood extracted by Gilbert White from the body of an old one, killed in the month of August. I quote his account of the circumstance:—"On August 4th, 1775, we surprised a large viper, which seemed very heavy and bloated, as it lay in the grass, basking in the sun. When we came to cut it up, we found that the abdomen was crowded with young, fifteen in number; the shortest of which measured full seven inches, and were about the size of full-grown earth-worms. This little fry issued into the world with the true viper spirit about them, showing great alertness as soon as disengaged from the belly of the dam: they twisted and wriggled about and set themselves up, and gaped very wide, when touched with a stick, showing manifest tokens of menace and defiance, though as yet they had no manner of fangs that we could find, even with the help of our glasses. There was little room to suppose that this brood had ever been in the air before, and that they were taken in for refuge at the mouth of the dam, when she perceived that danger was approaching; because then, probably, we should have found them somewhere in the neck, and not in the abdomen." (Nat. Hist. Selborne, Let. lxxiii). In reference to the above, Jesse, in his edition of White's Selborne, adds the following note:—"The very circumstance which Mr. White mentions, of the young vipers being fully seven inches in length, proves that they had been in the open air before, as they have been known to leave the stomach of the dam when they have been from one to two inches in length. From various facts communicated to me by viper-catchers and others, I can have no doubt but that the young vipers, when alarmed, take refuge in the inside of the parent, who extends her mouth for the purpose." I will now take my leave of the viper by respectfully proposing three queries to the readers of the 'Zoologist.' At what time of the year are young vipers generally produced? How many broods are there in a season? What is the average size of the young when brought forth?—*T. R. Archer Briggs; 4, Portland Villas, Plymouth, April* 19, 1870.

Proceedings of the Entomological Society.

March 7, 1870.—F. P. PASCOE, Esq., V.-P., in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Berliner Entomologische Zeitschrift,' 1869, parts 3, 4; presented by the

Entomological Society of Berlin. 'Journal of the Royal Agricultural Society,' series 2, vol. vi. part 1; by the Society. 'Natural History of the Tineina,' vol. xi.; by H. T. Stainton, Esq.

Election of Members.

The Rev. Richard P. Murray, of Mount Murray, Isle of Man, was elected a Member. M. J. C. Puls, of Ghent, was elected a Foreign Member.

Exhibitions, &c.

Prof. Westwood exhibited a number of locusts, which formerly belonged to the collections of some of the principal entomologists in the early part of the century, and which still bore the labels of those entomologists "migratoria, Linn." These insects, however, were not the migratoria of Fischer, but were the cinerascens of Fabricius and Fischer, of which Christii of Curtis was only a synonym. The principal distinguishing character was the form of the pronotum, which in one was narrowed before the middle, and almost flat on the top, but in the other was of equal breadth throughout, and arched on the top, with the dorsal carina more raised and prominent. Prof. Westwood remarked that tradition and old specimens were, on a point of this kind, of more importance than figures in antique works, and he thought Fischer had made a mistake, and applied the name migratoria to the wrong insect. On the evidence afforded by these old specimens, he suggested that the true migratoria of Linné was not the locust with a flat or but slightly carinate pronotum, constricted in front, but the locust with an arched pronotum, with the crest or median ridge higher and more produced in front.

Mr. F. Smith said that, in consequence of a doubt expressed by Prof. Westwood at a previous Meeting, he had written to Prof. Stal, of Stockholm, who informed him that the insect placed in the Stockholm Museum as the migratoria of Linné is the form described under that name by Fischer. Dr. Stal further said that he had never had any doubt about the species, as Fischer's migratoria is the only species of locust which to his knowledge had ever been found in Sweden. Mr. Smith remarked that Linné described migratoria in the Fauna Suecica; Fischer was acquainted with both migratoria and cinerascens, and figured their distinguishing characters, migratoria having a flat prothorax, cinerascens an arched one; and now to apply the name migratoria to the form with the arched prothorax, on the strength of the specimens so labelled, would only be productive of confusion.

Prof. Westwood said that he had examined Major Parry's specimen of Nicagus obscurus (*vide* S. S. 2071), and without saying to what group of Lamellicorns the genus was properly referable, he felt clear that it did not belong to any of the Lucanoid families.

The Rev. H. S. Gorham sent for exhibition British specimens of Sunius neglectus, *Maerkel*, accompanied by the following note:—

"Sunius neglectus is not yet in the British list, and is very closely allied to S. angustatus, *Erichson;* probably they are generally mixed in collections. I have had them separated for several years, and when on a visit recently to Mr. Crotch, with his assistance was able to determine the species. From angustatus it differs in having the head, thorax and elytra proportionally shorter and more convex, less closely punctured, and therefore more shining. Angustatus has a more linear aspect, and the whole insect is more opaque. In angustatus, again, the elytra have a tendency to become pale, particularly at the shoulders, and the apex is more broadly testaceous, though this colour does not usually extend so far up the suture as in neglectus. I send two specimens of angustatus for comparison with what I regard as neglectus; one of them is a very beautiful bimaculate variety."

Mr. Albert Müller exhibited specimens of an Indian gall formed on the mid-rib of the leaf of a species of Gnetum; the galls were of the size of a small acorn, consisted of a single cell, and were placed longitudinally along the mid-rib on the under side of the leaf.

Mr. Janson exhibited a large number of butterflies collected by his son, Mr. E. M. Janson, at Chontales, Nicaragua, in November and December, 1869.

Mr. Butler exhibited specimens of Argynnis Adippe and Niobe, and intermediate forms, in corroboration of his previously expressed opinion that the two were not distinct species.

Dr. Wallace, on behalf of Mr. Harwood, exhibited some dark suffused varieties of Melitæa Athalia; and specimens of Herminia derivalis.

Mr. Stainton exhibited Cosmopteryx Lienigiella, bred in England from Russian larvæ. The larva was discovered two years ago, near Riga, feeding in the reed (Arundo): its habits once known, it had since been found in this country, and Mr. Stainton had within the last two or three days bred the moth from a native larva.

Dr. Wallace addressed the Meeting on the progress and prospects of sericiculture in this country and some of our colonies. He exhibited English-bred specimens of Antheræa Yamamai, remarkable for their great variation in tint, from ashy brown, through various shades of red, to a bright yellow or pale dove-colour; also English and Austrian cocoons of the same species, which had succeeded better in 1869 than in 1868: he considered the Eastern counties of England unfavourable on account of the dry warm temperature, and that the more humid climate of the Western coast was better suited to the insect; an equable temperature from 60° to 75° was requisite, with abundant ventilation and great cleanliness: in Moravia the Baron de Bretton had reared 28,000 cocoons in 1869, which were all devoted to the production of eggs: and Dr. Wallace thought the efforts now made in Europe to acclimatize this species would very shortly be successful. He also exhibited specimens of Bombyx Pernii obtained from cocoons imported from China, and some English cocoons: this species showed no tendency to vary; it was hardy and vigorous, and likely to do well in Europe, but being double-brooded in China, this had to be carefully guarded against in attempting to acclimatize the race. Cocoons of B. Pernii and of Saturnia Cecropia had been sent to Australia, with a view to the cultivation there of these useful races. Dr. Wallace also exhibited a specimen of the American oak-feeder, Bombyx Polyphemus, reared in England from the egg; but this species was not yet sufficiently known in this country to speak with certainty about its value as a silk-producer. Also, Japanese silk and cocoons of the mulberry-worm, Bombyx mori, some very large white cocoons of a noted French race, and specimens of English silk and cocoons, which, especially some produced by Captain Mason of Farnborough, contrasted favourably with the other specimens, and had been pronounced by competent judges to be equal to the best Italian samples. The Silk Supply Association had been formed about a year ago, for the purpose of stimulating the production of silk in all countries where it was possible, and wherever the mulberry tree would grow silk might be produced: silk was the most paying crop grown; and California, Australia, the Cape of Good Hope, New Zealand, Egypt, Syria, might all be mentioned as admirably adapted to silk culture. The first number of the 'Silk Supply Record' contained an advertisement by a gentleman at the Cape, offering half profits to any one who would go out and teach him how to grow silk. California last year sent over to Europe her first contribution of silk-worm eggs; Australia this year was doing the same thing; eggs from Egypt, Syria and the Cape would soon follow; and as the price of the eggs was now very high, large profits would at first be made by the sale of eggs: four years ago the price in Japan was four shillings to five shillings an ounce, now it was a guinea an ounce, and the demand could not be satisfied; on the Continent eggs of the best races sold at a franc a gramme. Dr. Wallace also exhibited some Californian cocoons of excellent quality, and a piece of black silk, part of the first specimen made in California from Californian produce; also a Japanese cocoon of Bombyx mori pierced by a parasite which he thought was probably a species of Diptera: this parasite, unknown in Europe, caused great loss to the Japanese breeders by spoiling the cocoons. The cultivation of mulberry-silk had been successfully introduced into the centre and north of France, where the climate was more variable and cold than in England; and, fortified by the opinion of M. Guérin-Méneville, Dr. Wallace urged the desirability of further experiment in this direction in England: the process of reeling was simple and easily learnt, superior machinery had recently been invented in this country to facilitate the process, and cocoons would now be imported, the reeling of which would afford a new and healthy occupation for women and children.

In reply to a question from Mr. Edward Sheppard, as to the slow growth of the mulberry tree, Dr. Wallace remarked that he was glad to correct a popular error on this point. The Morus alba, M. Moretti, M. alpina, M. Japonica and others, were used in silk culture, but the black-fruited Morus was not: the species mentioned were all hardy, and of rapid growth. Morus Japonica especially produced very large leaves; M. multicaulis grew rapidly and produced large leaves, but was liable to be cut off by frost.

Dr. Wallace remarked that in Bombyx Pernii sexual desire appeared to be inordinately strong, and on three separate occasions, when the supply of females was not equal to the demand, he had found two males inter se alium alio junctos, sibi mutuum coitum præstantes: in one case he had killed the moths with chloroform whilst they remained in pæderastic contact, and they were exhibited in situ. They were placed side by side, face to face and tail to tail, with their legs mutually intertwined.

Dr. Wallace also mentioned that males of Bombyx Pernii had paired with females of Saturnia Cecropia, S. Polyphemus and Antheræa Yamamai. From the last mentioned union fertile eggs had been obtained; a female Yamamai emerged on the 17th of September, 1869, and she was placed the next evening alone in a cage with a male Pernii which had come out late in the autumn; they were soon in copulâ; on the 19th, on being moved, she spurted out a whitish fluid similar to that ejected by the male Pernii, and on that day she laid 50 eggs; on the 20th she laid 75 more, making a total of 125 eggs, and was then killed for the cabinet: the eggs resembled the usual Yamamai eggs, and were kept apart in a cool room facing north; on the 3rd of November it was found that most of them had hatched out: the larvæ had red heads and black bodies, and so far resembled Pernii, which are at first black, but they had also yellow rings and lateral streaks; some were lighter, some darker; they were very hairy, their bodies long and slender, the tubercles yellow and containing several bristles. They continued to hatch out for several days till all were hatched. On the 12th of November Dr. Algernon Chapman received from Dr. Wallace two living larvæ, and fed them on Quercus pedunculata; on the 20th both rested for their first moult, and on the morning of the 23rd both had changed their skins; one ate its cast-off skin, the other did not; on the 29th one of the larvæ was missing, and on the 1st of December the remaining one suspended itself for another change of skin; on the morning of the 4th it had changed skin, and during its feeding up in this skin the supply of Quercus pedunculata failed, but various species of evergreen oak were tried, and it seemed to eat almost any indifferently; on the 16th of December it again threw off its skin, and after the 23rd was at times in a temperature as low as 50° Fahr.; on the 2nd of January, 1870, it again changed its skin, and ate the cast-off skin during the night; and on the 18th it began to look out for a place to spin. In the last two skins it would drink several drops of water, as many as six or eight, every day, but when the food was wet it would not do so: except at the period mentioned above, the temperature was always above 55°, and the only effect of the lower temperature was to retard growth. The cocoon obtained from this larva had been sent by Dr. Chapman to Dr. Wallace, and was exhibited to the Meeting: the chief feature worthy of notice was the dominant influence of the male parent upon the hybrid offspring, the larva throughout its career and the cocoon more closely resembling B. Pernii than A. Yamamai. The dominant influence of the male had also been observed by Mr. Brady, of Sydney, in his experiments on B. mori (see Report of Acclimatization Soc. of Sydney for 1868). Another point worthy of observation was that, even at so late a period of the year, the larva fed well on the evergreen oak, which, according to Dr. Wallace's experience, was largely eaten by all the oak-feeding species.

Paper read.

The following paper was read:—"Descriptions of twelve new exotic species of the Coleopterous family Pselaphidæ;" by Prof. Westwood.

Eight new genera were founded, under the names Goniastes, Rhytus, Curculionellus (three species), Sathytes, Pselaphodes, Sintectes, Phalepsus and Ryxabis; and two species were added to the genus Bryaxis.

March 21, 1870.—H. W. BATES, Esq., Vice-President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—'Tijdschrift voor Entomologie,' ser. 2, vol. iv. pts. 2—6, vol. v. pt. 1; presented by the Entomological Society of the Netherlands. 'Stettiner Entomologische Zeitung,' 1870, pts. 4—6, by the Entomological Society of Stettin. Stierlin's 'Käfer-Fauna der Schweiz'; by the Entomological Society of Switzerland. 'L'Abeille,' vols. i.—vi.; by M. de Marseul.

Exhibitions, &c.

Mr. Dunning exhibited a locust captured near Thirsk, Yorkshire, in the autumn of 1849: the prothorax was flat and constricted in front, and notwithstanding the contention of Prof. Westwood (S. S. 2144) he thought this was the true Locusta migratoria of Linné. The appeal to tradition did not tell entirely on one side: Fabricius when he described cinerascens was acquainted with migratoria, and it was clear from his description that cinerascens was the form with the arched prothorax; consequently migratoria, from which Fabricius separated cinerascens, was according to his belief the form with the flat prothorax. But further, from the time of Fabricius to the present, cinerascens had always been regarded as a doubtful species, the majority of authors having treated it as only a variety of migratoria; the entomologists from whose collections the Oxford specimens were derived might have been of this opinion; at all events until it was shown that they recognized the existence of the two as distinct species, the argument derived from their having labelled specimens of cinerascens with the name migratoria was far from conclusive. Finally, Linné's own description of migratoria applied to the form commonly so called, and not to the form with the arched prothorax. The differences between the two had been pointed out by M. Brunner de Wattenwyl (Ann. Soc. Ent. Belg. xi. 32) so clearly as to have induced M. de Selys Longchamps to recognize Pachytylus cinerascens as a species. The recent discussion had been provoked by the appearance in this country of Acridium peregrinum, and had satisfactorily brought out the fact that, if migratoria and cinerascens (= Christii, *Curtis*) were really distinct species, both of them had occurred in Britain.

Mr. Howard Vaughan (on behalf of Mr. Henry Moore, who was present as a Visitor) exhibited some specimens of Dianthœcia conspersa, two of which were so coloured as to bear a singular resemblance to D. Barrettii: they were found on the coast of Devonshire in 1861. Although the varieties of D. conspersa were mixed with true conspersa and true Barrettii, the Lepidopterists present had no difficulty in distinguishing between the Barrettii and their simulators.

Mr. Bond exhibited Epichnopteryx betulina, *Zell.* (= Psyche anicanella, *Bruand*), found by Mr. Mitford at Bishop's Wood, Hampstead, in 1869: the female was distinguished by a snow-white anal tuft; the larva-cases resembled small cases of Psyche fusca, but the habit of the insect was quite different, E. betulina being always found on the upper branches of the birch. (See Ent. Mo. Mag. vi. 94, 186).

Mr. Stainton exhibited Cosmopteryx Lienigiella, bred from a larva found feeding in the reed (*Arundo phragmites*), in Wicken Fen, Cambs. The English specimen was both larger and fairer in tint than the Russian specimens shown at the previous Meeting (S. S. 2145).

Mr. F. Smith exhibited a larva from Monte Video, profusely covered with hairs or bristles having clavate tips: he presumed it was the caterpillar of a moth, and Dr. Horsfield had described the larva of Limantria as having a somewhat similar covering.

Mr. M'Lachlan added that the larva of Acronycta alni possessed some hairs of the same shape, though few in number.

Mr. Albert Müller mentioned that Meyer-Dür had pointed out certain differences between the larvæ of Argynnis Adippe and Niobe: in his 'Verzeichniss der Schmetterlinge der Schweiz,' published in 1852, that author states that Argynnis Niobe in Switzerland inhabits only the alpine and subalpine regions from 3000—5600 feet above the sea, and that its larva has in the full-grown state a white dorsal stripe and flesh-coloured spines, whilst A. Adippe is not found at a greater elevation than 3300 feet, and its larva has no white dorsal stripe, but a pale-reddish lateral stripe instead. Mr. Müller argued, that though the food-plants of both were various species of violet, until this evidence was rebutted, or unless two different larvæ produced the same form of imago—unless there were dimorphic larvæ—Adippe and Niobe must be considered distinct species, even though (which he did not admit) the perfect butterflies were undistinguishable.

Mr. Butler was not acquainted with the larvæ of Argynnis Adippe and Niobe, and his suggestion that the two forms were one species was made from observation of the perfect insects only; he had found the two flying together, and the sexes pursuing one another: he thought the differences between the butterflies, without amounting to specific distinction, might be accounted for by differences in the external conditions to which they were subject. An instance of this kind had lately come under his notice; in India, Capt. Lang had been in the habit of taking what at the time of capture he thought were two distinct butterflies, one in marshy land, the other in dry situations, the marsh insect being thickly covered with down, the highland insect not; but Capt. Lang was now satisfied that the two were but one species, Callerebia Scanda, which was liable to modification by surrounding circumstances.

Mr. Stainton mentioned an instance of dimorphism in the larva state; a form of larva of Sphinx Atropos sometimes occurred with the ordinary markings obliterated and with only a few whitish blotches in front, so that there was really nothing but the shape of the anal horn by which the larva could be identified as Atropos: he had known of the occurrence of about twenty of these abnormal larvæ in the last twenty years; and there was no perceptible difference in the imago.

Mr. J. Jenner Weir referred to Gnophos pullata, which was found nearly white on the chalk downs, and in fact varied from nearly white to sooty black according to the geological formation of the locality where it occurred.

Mr. Pascoe mentioned Apion Germari, which when found on Mercurialis perennis was constantly of one form, and when found on Mercurialis tomentosus was constantly of another form; yet no one hitherto had doubted the specific identity of the two forms.

Mr. Butler recalled the fact that, on the same plant of golden-rod (*Solidago virgaurea*), larvæ of Mamestra persicariæ might often be found of three or four different colours.

Mr. Henry Moore had once found larvæ of Eupithecia virgaureata feeding on the petals of a crimson dahlia, and they assumed a crimson hue, in lieu of the ordinary ochreous with sepia-coloured markings.

Paper read.

The following paper was read:—"Notes on the Butterflies described by Linnæus," by Mr. W. F. Kirby.

New Part of 'Transactions.'

The first part of the 'Transactions for the year 1870' was on the Table.—*J. W. D.*

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INSECT-HUNTER'S COMPANION.

THIS little book has long since been out of print. During the past two years so many communications were addressed to me, requesting to know where it could be procured, that, in the spring of last year I wrote to Mr. Newman, asking him whether he would undertake a second edition. It had been arranged to do so, when a similar work by Dr. Knaggs was announced, and we then thought it better to let the matter drop. Since then I have nevertheless had so many enquiries addressed to me respecting my own book, that I am led to suppose that many (young) Entomologists still wish for it. I have never had any pecuniary interest whatever in the book, nor do I propose having any. I can only hope that there may be a sufficient demand to save me from positive *loss*.

Rev. J. GREENE.

Apsley Road, Redland, Bristol.

☞ It is proposed to add a chapter on COLEOPTERA to the original edition.

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